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Growing Red Clover

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Growing Red Clover

By E. C. BLAIR, Extension Agronomist

Red clover has long been an important crop in Central and Western orth Carolina. It ranks among the first as a good crop for hay, r soil improvement, and for use as a cover crop. It has the added vantages of requiring very little labor in sowing; and of remaining the land two years instead of one, yielding good returns both years. s disadvantages are that it is rather particular in its soil requirements, that the seed must be sown in just the right way, to secure a od stand, and that weeds greatly damage the crop under certain nditions.

On fertile soil, well limed, one and one-half to two tons of hay per re may usually be expected at each cutting. The hay is fine in texre and quality, so that livestock will eat the whole of it. It ranks gh in food value, containing 12.3 percent protein, 31.1 percent carhydrates, and 3.3 percent fat.

Since red clover is grown for soil improvement, it is of interest to now that each ton of the dry hay contains 41.8 pounds of nitrogen, 6 pounds of phosphoric acid, and 41.6 pounds of potash. If the soil properly inoculated most of the nitrogen in the hay will have me from the air. When turned under, each ton of hay will add 1.8 pounds of nitrogen to the soil, or the equivalent of 278 pounds nitrate of soda. The phosphoric acid and potash in the plant were ken from the soil, but are returned in a form readily available r future crops. In addition to this, the soil receives a large amount organic matter.

Leaving out the question of plant food, organic matter is of prime nportance for its mechanical effect on the soil. By making it more orous, organic matter helps to prevent soil washing, as more water n sink into the soil. This is of untold benefit to crops in dry weather. rganic matter helps to prevent heavy soils from running together nd baking and permits them to be more easily worked. Organic natter is also constantly being burned up by the action of sunlight n the soil.

Most North Carolina soils, when first cleared, have a good supply f organic matter, but because of the cropping systems followed in hich too much attention is paid to immediate returns, and not nough to keeping plenty of this substance in the soil, the supply rows less each year. Some farmers make an effort to revive depleted oils by using larger amounts of commercial fertilizer, but with poor esults. A system of rotation that includes crops for turning into the

land, and the use of fertilizers judiciously in connection with rotation must be followed if the soils are to be improved, or even m tained in their present state of productiveness.

HOW THE CROP GROWS

Red clover is a biennial legume, and one of the true clov The seed may be sown either in the fall or spring. Each plant m an abundance of fine, erect stems, coming out from the crown of plant, at the ground. The stems grow from one to two feet high even higher. The plant produces considerable foliage. The le consist of three leaflets, dark green in color, with an irregular spo lighter green in the center of each. The flowers are pink, and borne in heads at the ends of the stems. The roots penetrate dee into the soil.

There are two varieties: The **medium red,** and the **mammoth sapling.** The two are similar in general appearance, the main di ence being that the mammoth is larger, and later in maturity. It thrive on poorer soil than will the medium red. Owing to its late it makes a poor second crop.

Red clover remains on the land through two summers, on rich it yields a good crop of hay late in the first summer. This is especi true of clover sown in the fall. On ordinary land the growth is s the first year, and there is not much to cut but weeds. However, t should be removed; because they take moisture needed by the yo clover plants, and in order to have a clean crop of hay the second y During the second year red clover makes two crops. The first mat about June 1st. This is the main hay crop. The second crop ri about August 1st, and makes about the same amount of growth the first crop. It is objectionable for hay, in that it causes saliva of livestock. This is fortunate, for the second crop is there usually turned under for soil improvement, instead of being taken It should always be borne in mind that when the first and se crops are both removed, there will be no improvement of the A crop must be plowed in if the supply of nitrogen and organic ma in the soil is to be increased. The second crop is also the princ source of seed, and is a good honey crop. Where a large acreag to be sown for hay, it is well to sow part of it to mammoth clo so as to lengthen the haying season. If seed are saved at home, o one variety should be grown on the farm; otherwise the seed of two will become mixed.

Being a legume, red clover can feed on nitrogen from the ai inoculated with the proper bacteria. In many sections of N Carolina, clover has been grown so extensively that these bacteria always present in the soil. Where there is any doubt of their p

nce, the bacteria should be supplied. This may be done by means of ommercial cultures, or by using soil from a field known to be inocu- ated. The same bacteria that inoculates red clover will inoculate rimson, alsike, or white clovers.

SOILS

Red clover does best on a fairly heavy soil, and is grown most xtensively on the red clays and clay loams of our Piedmont Section. lowever, good results are frequently obtained on sandy loam soils. he soil should be of moderate fertility, or better. Very poor, worn ut soil should be improved by means of soy beans, cowpeas or rye efore being sown to red clover. In general, land should be rich nough to produce 20 to 25 bushels of corn per acre if red clover s to succeed on it.

ACID SOILS

Many fields have made good crops of clover a few times; then each ucceeding crop has become poorer until finally there is a complete rop failure. This is usually because the repeated growing of clover as exhausted the lime supply of the soil. Red clover will tolerate ss soil acidity than most of our crops. The turning under of the sec- nd crop of clover adds organic acids to the soil; which are neutralized y lime in the soil until that lime is exhausted. Clover also feeds more eavily on lime than most crops, which hastens the exhaustion of he lime.

THE NEED OF LIME

The length of time that red clover can be grown on a given field ithout liming depends on several factors. The amount of lime nat- rally present in the soil has most to do with it. Some types of soil, uch as the black jack (Iredell) and deep red clay (Mecklenburg and Davidson) soils of the Piedmont section, carry a rather high content f lime, which makes them specially adapted to red clover. Experience as shown however, that in course of tie the lime supply of even these oils becomes exhausted and the clover fails. Some farmers use liberal mounts of basic slag, which contains forty per cent quick lime, as a ource of phosphoric acid. The lime in this material helps greatly in rowing clover. Recently other phosphatic fertilizers containing lime ave been put on the market. They, as well as basic slag, seem to give ood results in neutralizing soil acids; but at present prices more hosphoric acid and more lime may be obtained for a given amount of oney by buying 16 percent acid phosphate and ground limestone. he results are usually better because more lime will be applied to ach acre when limestone is used. Stable manure is often helpful in etting a stand of clover where lime is not used. A rich soil will make

a better crop of clover without lime than one of moderate ferti
The same soil, limed, will make a much larger crop. As we g
clover partly for soil improvement, it is better to lime ordinary
and grow clover there than to grow it on rich land without lime.

If a good application of ground limestone at the rate of one or
tons per acre is made where clover has failed, the next crop is usu
much better than the field has ever produced before. The valu
lime has been proven hundreds of times by liming part of a field
leaving the other part unlimed, then sowing clover. Figures 1
2 show results obtained at the Piedmont Branch Station Farm
Statesville, N. C., in a test of this kind.

In general, a good application of lime will double the yield of
clover. Not only will it grow ranker, but the stand will be be
because the crop will have sufficient vigor to keep the weeds ch
out. It is best to apply the lime six months to one year before so
the seed, as it then has plenty of time to neutralize acids in the
If clover is to be sown on small grain in the spring, lime may
applied the preceding fall while preparing the ground for the gr
or it may be put on while getting ready for corn, or whatever
precedes the small grain.

In the long run it will be necessary to lime any soil where red cl
is regularly grown. The lime should be applied at least once in
rotation. The initial application should usually be one to two ton
ground limestone per acre. Follow this with one ton every t
years, or 1 1-2 tons or more every five years. A definite place sh
be had in the rotation for applying the limestone. As before sta
the best time for this is from six months to a year before sowing
clover seed. The cost of liming should not be charged entirely to
clover crop, for the lime will directly benefit any other legumes gr
in the rotation. On limed land the second crop of clover will
larger, and this should be turned under for soil improvement.
this way the lime will indirectly benefit all crops grown.

HOW TO FERTILIZE

It should not be understood from the above that lime can take
place of fertilizers, for clover or any other crop. We must still sup
the important plant foods, nitrogen, phosphoric acid and potash.

Although red clover is a legume, it needs nitrogen supplied eit
by stable manure or commercial fertilizer, when sown on poor s
This will give it some nitrogen to feed upon while the roots are bec
ing established, and before it can take nitrogen from the air. M
a stand of clover has been starved out through lack of nitro
during this period. Fertile soils contain enough nitrogen to start
clover off, and none need be applied to them.

FIG. 1. Where red clover was sown without liming. Note almost total ilure. Iredell Test Farm, Statesville, N. C., 1920.

FIG. 2. Red clover on same field as Fig. 1, but with two tons limestone per re. Iredell Test Farm. Statesville, N. C., 1920.

The soils of Western North Carolina are nearly all deficie phosphoric acid. It is well known that this plant food must be plied if crop yields are to be satisfactory. This is especially tr red clover, which when inoculated can use nitrogen from the but not unless it has phosphoric acid to go with the nitrogen. T fore, red clover should be well supplied with phosphoric acid.

Clover feeds heavily on potash. One ton of red clover hay con more potash than a ton of 8-2-2 fertilizer. Because most soi Western North Carolina show a high content of potash, little or is used for clover. However, it often happens that while the plenty of potash in the soil, not enough is available at one time to ply a heavy feeder like red clover.

When muriate of potash is selling around $50 per ton it would erally pay to use 40 to 50 pounds per acre. This would cost $1.($1.25. In place of 50 pounds of muriate of potash (50 percent ash), 200 pounds of kainit (12.5 percent potash) or 125 po manure salt (20 percent potash) may be used with equally results.

"Black-jack" lands are so deficient in potash that clover, soyb cotton and corn often rust or "french" when grown on them. least 300 pounds of kainit should be used on such soils.

Where red clover is sown on wheat in the spring, a good syste fertilization for both crops is as follows:

2,000 pounds (or more) ground limestone per acre before so wheat.

300-400 pounds 16 percent acid phosphate per acre when whe sown.

100 to 200 pounds acid phosphate and 40 to 50 pounds muriat potash when clover is sown in spring. If the land is poor add 5 100 pounds nitrate of soda to this application, or top-dress the w with stable manure.

It is important to apply some fertilizer when the clover seed sown, as this will be a great help toward getting a stand.

If clover is to be sown at the same time with wheat, fertiliz follows:

300 to 400 pounds 16 percent acid phosphate and 40 to 50 pou of muriate of potash at sowing. Add 25 to 50 pounds nitrate of s to this to start the clover if the land is poor, and 50 to 75 pou nitrate of soda the following spring if needed. The next spring clover's second year) top dress the clover with 100 to 200 pounds percent acid phosphate per acre.

Where clover is sown alone use 200 pounds 16 percent acid p phate and 50 pounds muriate of potash per acre when sowing; t

ply 100-200 pounds 16 percent acid phosphate early in the second ring.

On "Black-jack" lands the amount of potash should be increased 50 cent and the acid phosphate cut in half.

SEED FOR PLANTING

While it is good policy to plant only the best seed of all crops, this is ecially true of red clover seed. Dodder, plantain, and many other noxious weeds have seed nearly the same size as red clover. These d are often found in clover seed offered for sale; sometimes as many 100,000 of them to the pound. When these weeds are once sown ey will remain on the land as long as the clover does. All clover d should be tested for purity and germination, and if found unsatactory, should be rejected. Reliable seed houses will send out sames of seed they have for sale, and the N. C. Department of Agriculre will test these free. Buy seed only from reliable firms, and buy e best they have to offer. They will cost more per bushel than low ades, but less for each pound of actual viable red clover seed.

The second crop of clover makes most of the seed, and North Caroa growers sometimes secure their seed by cutting and threshing this op. Home grown seed are likely to contain more seed seeds than mmercial seed. This is because they come from fields where there e too many weeds, and because they are seldom properly cleaned. ne ordinary clover huller does not separate the weed seeds from the over seeds. After threshing, the seed should be recleaned with a ecial seed cleaner. **Do not attempt to save clover seed from fields at are not free of weeds.** Remember, also, when the first crop is cut r hay and the second for seed, that the soil has been depleted instead improved.

SOWING THE SEED

In sowing the clover in the fall the usual dry weather that evails for several weeks must be reckoned with, as well as the winter eezes. After the land is plowed the land should then be harrowed well veral times before sowing, so as to make a fine seed bed and one that ill conserve moisture. The seed should be sown early enough to make good root system before cold weather. Otherwise, freezing of the il may lift the young plants out of the ground, which, of course would ll them. On the other hand, hot weather will ruin the young plants sown too early. September 15 to October 15 is a desirable time for fall wing of red clover alone. Clover sown in the spring must be put in te enough to avoid severe freezing, which will kill the plants when ry young; and early enough to let them take hold well before hot, y weather of summer. On an average, between March 10 and April

10 will be safe. There is always plenty of moisture at this tim year.

Success in securing a stand of clover is greatly influenced by way the seed are sown, as well as the time. Formerly it was re mended to sow when the ground was heaved up by a freeze, or si to sow the seed and harrow or roll them in. Fifteen pounds of per acre was the standard rate. More recent experience, how has taught that a grain drill with a clover seeding attachment wi better work. With it, the seed are more evenly spaced and cov better, so that each seed has a better chance to grow. **Many lea farmers claim that with the grain drill they need only half as m seed to get a stand as when sowing by hand. Instead of fi pounds, they sow seven or eight pounds per acre.** Clover seed always high in price, so that at this rate the seeding attachment w soon pay for itself.

There are two types of seeders in use. One kind drops the seed ahead of the drill discs, and the other delivers the seed into the g spouts. When sowing clover the drill must be so adjusted as no cover the seed too deep. This may be done by releasing the spr that bear upon the discs. A special clover drill is on the ma which is said to require even less seed than the seeding attachn This might be a profitable investment for large growers.

Some farmers mix clover seed with fertilizer, and sow them toge using the grain drill. They claim that this practice gives good res

SOME METHODS OF SOWING

On livestock and dairy farms, red clover is sometimes sown alon the fall on specially prepared ground. The clover gets an early s in this way, and will make a good cutting of hay the first yea addition to the two crops during the second year. It will also af some pasturage during the spring and fall. It is also sown with w or other grain in the fall. Some growers report better succes sowing clover alone than in this way. Wheat should not be s before October 10 or 15 on account of the Hessian fly, and this is rather late for clover. Still another way is to sow the clover in spring on land where small grain, usually wheat, is already grow Under these conditions the clover will make little growth the year, unless the land is fertile. A cutting of weeds containing s clover is secured late in the summer. This has value as a low g roughage, but the main purpose in mowing the weeds is to pre them going to seed, to allow the clover more room to grow, and to them out of the way of the next year's hay crop. However, we h the advantage of not having to prepare the land for the clover, simply to sow it. Also, we get a crop of grain the first year to m

for small returns from the clover. Many farmers grow wheat and ver continuously on the same land, depending on the clover to re- d itself. The great disadvantage of this system is that the field not planted in a cultivated crop. Weeds become more abundant ry year, and finally kill out the clover.

In the Coastal Plain Section, red clover may be grown on the vier soils by sowing between corn or cotton rows in the fall. It uld be lightly harrowed with a cultivator, just as crimson clover treated. It will give abundant yields of hay for two years.

CURING THE HAY

For the best hay, clover should be cut when just past full bloom. e hay should be allowed to wilt, then should be raked into winrows. e curing should be done in the winrow or in the cock. By this thod most of the leaves will remain on the plants, increasing the tritive value, and the color and aroma of the hay will be better. hen clover hay is cured on the ground where it falls, most of the ves become brittle, and will fall off in handling.

ROTATIONS WITH RED CLOVER

A few good rotations using red clover for hay and soil improvement e as follows:

. 1.

1st year: Corn, with cowpeas or soybeans in the same row or in alternate rows with the corn. Wheat, oats, or rye sown in fall.
2nd year: Wheat, oats, or rye, with red clover.
3rd year: Red clover, first crop for hay, second for soil improvement.

. 2.

1st year: Corn, followed by rye or crimson clover.
2nd year: Rye or crimson clover turned under.
Soybeans or cowpeas, used for hay or seed.
Wheat, oats or rye sown in fall.
3rd year: Wheat, oats, or rye, with red clover.
4th year: Red clover.

te:—Soybeans may be planted in the corn if desired.

. 3.

1st year: Corn, with cowpeas or soybeans.
2nd year: Cotton, wheat, oats, or rye sown in fall.
3rd year: Wheat, oats, or rye, with red clover.
4th year: Red clover.

No. 4.

1st year:—Corn with soybeans or cowpeas.
2nd year: Cotton, followed by rye as a cover crop.
3rd year: Soybeans or cowpeas.
Wheat, oats or rye in fall.
4th year: Wheat, oats, or rye with red clover.
5th year: Red clover.

No. 5.

1st year: Corn, followed by red clover in fall.
2nd year: Red clover.
3rd year: Red clover, second crop turned under for wheat.
4th year: Wheat, followed by soybeans, or cowpeas for soil improvement.

No. 6.

(For heavy lands in the Coastal Plains—well drained)
1st year: Corn, with soybeans.
Oats sown in fall.
2nd year: Oats, followed by soybeans or cowpeas.
3rd year: Cotton, red clover sown in cotton middles in fall.
4th year: Red Clover.
5th year: Red Clover.